Five ESTO Instruments Awarded Funding for Airborne Integration

In July 2010, five Instrument Incubator Program (IIP) technologies were selected by the Airborne Instrument Technology Transition (AITT) program to receive additional funding for integration and testing on board various NASA airplanes and UAVs. The awards are intended to transition instruments into suborbital, airborne tools that can participate in field experiments, evaluate new satellite instrument concepts, and/or provide calibration and validation of satellite instrument data. The selected IIP projects are five of the seven awards made by AITT from a field of 31 proposals.

The **Advanced Imaging Lidar for Forest Carbon Studies** project will utilize a new type of lidar – an electronically steerable flash lidar (ESFL) – to produce three-dimensional views of forest and vegetation and provide estimates of biodiversity, carbon sequestration, distribution of foliage, and fuel for forest fires. The ESFL instrument, which utilizes multiple, independently steerable beams from a single laser, will fly on the ***Twin Otter aircraft***. *(Principal Investigator: Carl Weimer, Ball Aerospace)*

The **Airborne Glacier and Land Ice Surface Topography Interferometer (GLISTIN-A)** is a millimeter-wave interferometer that can simultaneously generate both imagery and topographic maps of ice that are accurate to within 10 centimeters (4 inches) of elevation on scales comparable to the ground footprint of a lidar on a satellite. GLISTIN-A, which will fly on the ***Global Hawk UAV*** along side the Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR), could provide detailed maps of scientifically significant ice-sheets and serve as a compliment to the ICESAT II mission. *(Delwyn Moller, Remote Sensing Solutions)*

The **Cloud-Aerosol Transport System (CATS)** instrument is a combination of a Doppler lidar and a high spectral resolution lidar that will fly on the ***ER-2 aircraft***. CATS will provide information about cloud and aerosol height, internal structure, and optical properties as well as derive wind motion, which enables studies of aerosol transport and cloud motion. The CATS instrument has direct application to future spaceborne missions, such as the Aerosol-Cloud-Ecosystems (ACE) mission, and could provide a critical validation role as an airborne asset. *(Principal Investigator: Matthew McGill, NASA GSFC)*

The **High Spectral Resolution Lidar (HSRL)** instrument will be upgraded from 23-meter to 3-meter vertical resolution and, onboard the ***P-3B aircraft***, will make ocean surface and subsurface measurements as well as retrieve profiles of cloud extinction. This project will also incorporate a hardened polarimeter that, with the HSRL, will be used for ocean ecosystem measurements and ocean-aerosol-cloud interactions. These measurements may be useful in refining the ACE mission instrument requirements. Information gained on subsurface measurements of coastal waters could also benefit the Geostationary Coastal and Air Pollution Events (GEO-CAPE) mission. *(Principal Investigator: Chris Hostetler, NASA LaRC)*

A third project directly supporting the ACE mission will **Integrate the HSRL Measurement Capability into an Ozone Differential Absorption Lidar (DIAL) System** for deployment on the DC-8 aircraft. In addition to the existing ozone profile capability, the combined DIAL-HSRL instrument will enable accurate measurements of aerosol and cloud aerosol properties without increasing the overall instrument footprint or weight. The completed system may prove useful for a variety of atmospheric and radiation science airborne missions. *(Principal Investigator: Johnathan Hair, NASA LaRC)*

For more information on emerging technologies for Earth science, visit the ESTO website at: http://esto.nasa.gov